

## CLAIMS

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent is:

1. A polishing pad having a body comprising:  
  
polymer fibers;  
  
at least one backing layer comprising a portion of said fibers embedded in a cured polymer matrix; and  
  
a polishing layer comprising a free length of said fibers disposed as a fibrous mat substantially free of said polymer matrix.
2. The polishing pad, according to Claim 1, wherein said fibers comprise a polymer selected from the group consisting of polyester, polypropylene, polyamide, rayon, polyimide, polyphenylene, and combinations thereof.
3. The polishing pad according to Claim 1, wherein the thickness of said fibrous mat length is up to about 10 mils.
4. The polishing pad according to Claim 1, wherein said fibers are coated with a polymer selected from the group consisting of styrenes, acrylates, methacrylates, acrylonitrile rubbers, butadiene-styrene rubbers, polyurethanes, fluorocarbons, and epoxies.
5. The polishing pad according to Claim 1, wherein said matrix is a polymer selected from the group consisting of polyester and polyether urethanes, polycarbonates,

polyacrylates, polymethylmethacrylates, polyaramides, thermosetting polymers, epoxies, and combinations thereof.

6. The polishing pad according to Claim 1, wherein said matrix polymer is solid or porous.

7. The polishing pad according to Claim 1, wherein said pad has a Durometer hardness in the range of from about 50 to about 100 Shore D.

8. The polishing pad according to Claim 1, wherein, said pad comprises from about 20% to about 80% fibers by weight and from about 80% to about 20% matrix polymer by weight.

9. The polishing pad according to Claim 1, wherein, said pad has a density in of from about 0.5 to about 1.1 grams per cubic centimeter.

10. The polishing pad according to Claim 1, wherein, said pad has a thickness in the range of about 10 to about 130 mils.

11. The polishing pad, according to Claim 1, wherein at least one backing layer further comprises up to about 10% by weight of microspheres.

12. The polishing pad, according to Claim 11, wherein said microspheres comprise a polymer selected from the group consisting of polyester and polyether urethanes, polycarbonates, polyacrylates, polymethylmethacrylates, polyaramides, thermosetting polymers, epoxies, and combinations thereof.

13. The polishing pad, according to Claim 11, wherein the diameter of said microspheres ranges from about 10 $\mu$ m to about 100 $\mu$ m.
14. The polishing pad, according to Claim 1, further comprising an array of voids formed therethrough.
15. The polishing pad according to Claim 1, further comprising at least one polishing groove disposed in said polishing surface.
16. The polishing pad according to Claim 1, wherein said at least one polishing groove communicates with at least one void of said array.
17. The polishing pad according to Claim 1, further comprising at least one backside groove disposed in a backside of said pad.
18. The polishing pad according to Claim 1, wherein said at least one backside groove communicates with at least one void of said array.
19. A method of fabricating a polishing pad comprising:
  - providing a mold having a cavity;
  - introducing fibers into said mold cavity, the loose fibers defining interstices;
  - introducing polymerization reactants into said mold cavity;
  - applying a differential pressure across said mold cavity thereby causing said reactants to substantially fill said interstices;
  - effecting at least a partial cure of said reactants to form a polymer matrix;

abrading said matrix from at least one major surface of said pad thereby forming a fibrous mat of fibers having a free length on said major surface.

20. The method of fabricating a polishing pad according to Claim 19, wherein said free length is up to 2 mils.

21. The method of fabricating a polishing pad according to Claim 19, further comprising introducing microspheres into said cavity prior to curing said polymeric matrix.

22. The method of fabricating a polishing pad according to Claim 19, further comprising defining at least one void through a thickness of said pad.

23. The method of fabricating a polishing pad according to Claim 19, further comprising defining at least one groove on a major surface of said pad.

24. A method of polishing a surface comprising:

providing a polishing pad comprising:

polymer fibers;

at least one backing layer comprising a portion of said fibers embedded in a cured polymer matrix; and

a polishing layer comprising a free length of said fibers disposed as a fibrous mat substantially free of said polymer matrix;

providing a surface to be polished; and

contacting said surface with said pad.

25. The method of polishing a surface according to Claim 24, wherein said surface to be polished is selected from the group consisting of Al, Al alloys, Cu, Cu alloys, W, W alloys, silicon oxide, polysilicon, silicon nitride, Ta, Ta alloys, Ti, Ti alloys, Au, Au alloys, and combinations thereof.

26. The method of polishing a surface according to Claim 25, further comprising providing a polishing compound to said surface to be polished.

27. A method according to claim 26, wherein said polishing is chemical-mechanical polishing (CMP).